

# GPM/TRMM data reading program guide (THOR version)



2021/12/06

5th ed.

This document describes how to use the THOR tool to read and display images from the Global Precipitation Measurement Satellite (GPM/TRMM).

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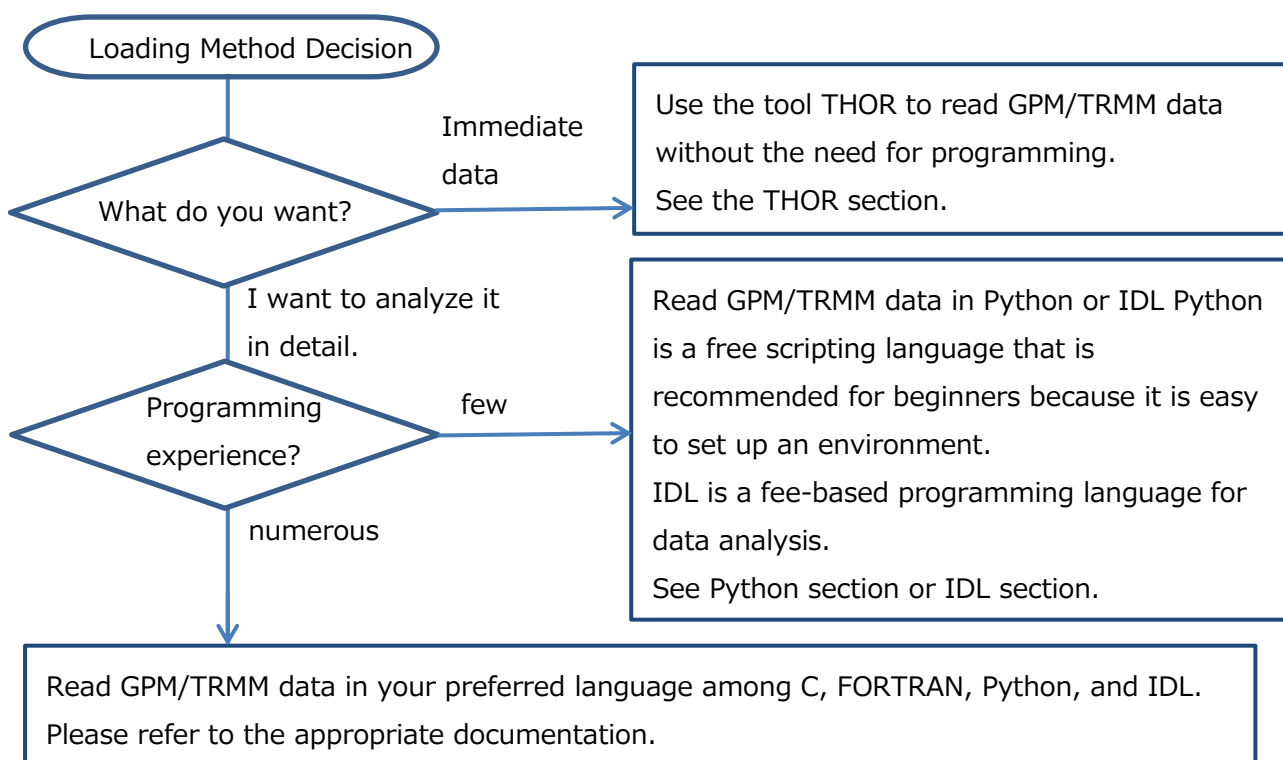
## Introduction

This document explains how to read GPM/TRMM data using a tool (THOR) that does not require programming.

In addition to THOR, there are other methods to read GPM/TRMM data as shown in Table 1.1. To determine which method to use, please refer to the following "Read Method Judgment Flow" below. Table 1.2 lists the operating systems on which the sample programs used in this document were tested.

**Table 1.1 GPM data loading methods**

	Data loading method	Name of material	remarks
1	Using THOR	GPM/TRMM Data Loading Program Guide (THOR Edition)	
2	Use IDL	GPM/TRMM Data Loading Program Guide (IDL version)	
3	Use C	GPM/TRMM Data Loading Program Guide (C language version)	
4	Using FORTRAN	GPM/TRMM Data Loading Program Guide (FORTRAN Edition)	
5	Using Python	GPM/TRMM data reading program guide (Python version)	



**Table 1.2 Sample Program Operation Check Table**

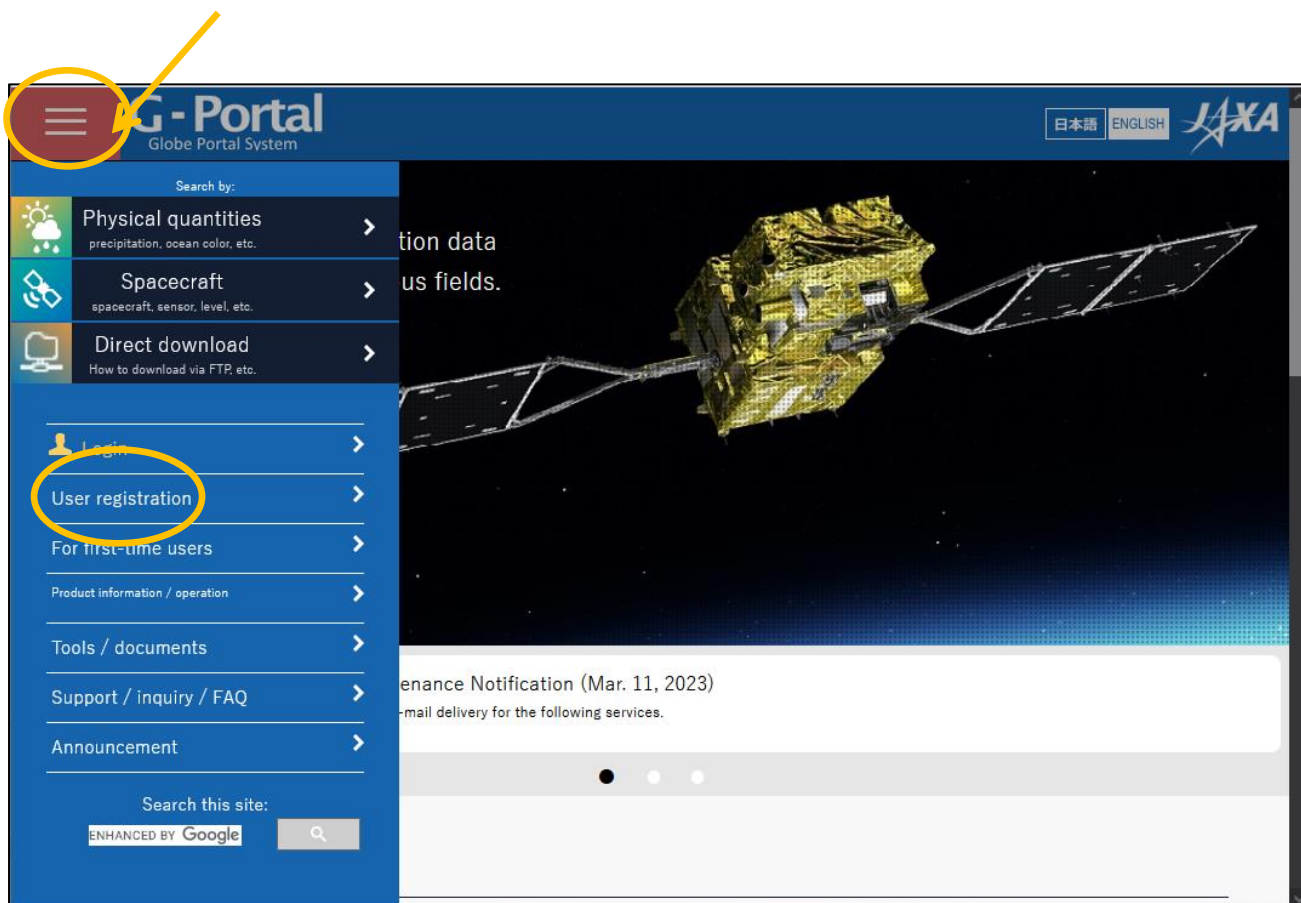
	sample program	Linux	Windows	remarks
1	c	○	-	
2	Fortran	○	-	
3	Python	○	○	
4	IDL	○	○	

○ : Operation is confirmed. - : Operation is unconfirmed.

## 2. how to obtain GPM/TRMM data

GPM/TRMM data can be obtained from the G-Portal site (<https://www.gportal.jaxa.jp/gp/top.html>). User registration is required to obtain the data. Please select "User Registration/Terms of Use" from the menu at the top of the G-Portal site to register as a user.

Click here to view menu



Read the terms and conditions and click "Agree and Next."

The screenshot shows the G-Portal registration interface. At the top, there is a navigation bar with the G-Portal logo, the text "Globe Portal System", and language options for "日本語" and "ENGLISH", along with the JAXA logo. Below the navigation bar is a progress indicator with five steps: 1. Terms of Use, 2. Enter registration information, 3. Confirm registration information, 4. Temporary registration completed, and 5. Registration completed. The current step is Step 1, "Terms of Use".

The main content area is titled "User Registration STEP1/5: G-Portal Terms of Use". Below the title, it states: "You need to register as a user to download products from G-Portal. Please read and accept the following terms and proceed to the next step:"

The "Terms of Use" section is displayed in a scrollable box. It begins with: "G-Portal is a free service providing data of spaceborne sensors that Japan Aerospace Exploration Agency (JAXA) has developed/involved. This Terms of Use states the terms and conditions under which you may use G-Portal. [JAXA Site Policy](#) is applied to the matter which is not specified in this Terms of Use. Please read carefully and make sure you accept this Terms of Use before using G-Portal. In order to use G-Portal, the user must agree to this Terms of Use. You can accept the Terms by clicking to agree to this Terms of Use, where this option is made available to the user by JAXA; or by actually using the services. In the latter case, the user understands and agrees that JAXA will treat the user's use of G-Portal as acceptance of the Terms of Use from that point onwards."

Section 1, "User Registration", states: "You need to create a user account to use G-Portal. Your user account and password will serve as your login information. The items required for G-Portal user registration are: a username, a valid e-mail address, the name of a user's affiliation, country or region of a user, and a user's purpose of use. For security reason, G-Portal requires you to use a valid e-mail address that identifies your educational or company affiliation (i.e., @jaxa.jp, @XX.edu, @companyname.com or @XX.org). If you use any e-mail address like Gmail, Yahoo, or any other free mail, you may not be able to complete your registration, or may not be able to receive e-mails from G-Portal."

At the bottom of the scrollable box, there is a checkbox labeled "I agree to the above terms of service". Below the scrollable box, there are two buttons: "I Agree - Continue" and "Do Not Agree".

You will be taken to the user registration screen.

**G-Portal**  
Globe Portal System

日本語 ENGLISH JAXA

1 Terms of Use 2 Enter registration information 3 Confirm registration information 4 Temporary registration completed 5 Registration completed

### User Registration STEP2/5: G-Portal Registering User Information

Please complete all the following items and press "Confirm Registration Information":

User account (Required):

Password (Required) ⓘ :

Password (reconfirm) (Required):

Name (Required):

Email address (Required) ⓘ :

Email address (reconfirm) (Required):

Organization:

Department:

Country:

Language (Required) ⓘ :  Japanese  English

Analysis

Algorithm Development

Data Validation

Applied Research

Education

Calibration

Order-made

Other

Purpose (Required):

Email Delivery Preference (Required) ⓘ :  By order  By preparation

**\*Handling of email addresses**

On this site, we strongly recommend using your corporate or institutional mail address (such as @jaxa.jp), to ensure you receive URL information of ordered products and user registration. If you do not receive such email, or if you receive an unexpected email, please contact the Support Desk. If you use a free email address (like @gmail.com, icloud.com) or private email, our email may not reach you.

**\*Be aware of phishing scams**

Avoid filling out forms contained in email messages that request personal information. We will never send any email requesting your user account or password.

Next

Cancel

For the subsequent procedures and how to obtain data after user registration, please refer to "5.2 How to Use the Data Providing Service" in the "GPM Data Users Handbook". For information on how to obtain the "GPM Data Users Handbook," please refer to "3.

### 3. how to obtain related documents and sample programs

There are two documents related to GPM data: the GPM Data Use Document and the Product Document. Both documents can be downloaded from the Global Precipitation Measurement (GPM) website (<https://www.eorc.jaxa.jp/GPM/index.html>). You can also download the sample codes described in this document from Top Page > Data Utilization

Documentation for GPM data use includes

GPM Data Application Handbook

file naming convention

The screenshot shows the 'Archives' section of the GPM website. The breadcrumb trail is 'Top > Archives > TRMM/GPM V07'. A navigation bar contains buttons for 'TRMM/GPM V07', 'TRMM/GPM V06', 'TRMM/GPM V06X', 'GPM/V05', 'TRMMV7A', 'GSMaP', 'References', and 'Others'. The main heading is 'TRMM/GPM Products (Version07)'. Below it, a note states: 'The format of L2/L3 products for GPM (Version06) and TRMM (corresponding to V8) has been integrated and the latest algorithm is Version07 (TRMM corresponding to V9)'. A table follows with columns for 'TRMM' and 'GPM' products.

		TRMM	GPM	
	PR/DPR L1B	V07 (corresponded to V9)	V07	2014/03/08-current V07
	PR/DPR L2/L3	V07 (corresponded to V9)	V07	2014/03/08-current V07
	SLH	V07 (corresponded to V9)	V07	2014/03/08-current V07
NASA	PR/DPR comb.(CSH)	V07 (corresponded to V9)	V07	2022/05/09-current V07
	VIRS/TMI/GMI	V07 (corresponded to V9)	V07	2022/05/09-current V07

at 2022/05

The screenshot shows the 'Data Utilization' section of the GPM website. The breadcrumb trail is 'Top > Data Utilization'. The main heading is 'Data Utilization'. Below it, there are three links: 'Data Download' (with a sub-link 'GPM products "G-Portal Earth observation satellite data providing system"'), 'Data Utilization Handbook', 'Documents related to products are here', and 'Papers related to products are here'.

Click "TRMM/GPM V07" to see the list of documents for product version 07.

## 4. installation of library tools

To read GPM data in THOR, THOR must be installed as shown in Table 4.1.

**Table 4.1 GPM data readout method**

	GPM data readout method	Required libraries, tools	remarks
1	THOR	THOR	

This manual has been tested in the following environments

**Table 4.2 Operating Environment**

(data) item	environment
calculator	Intel(R) Xeon(R) CPU ES-2665 2.4GHz
OS	Red Hat Enterprise Linux Server release 6.4
THOR	THOR 2.2.007

### 4.1 Installation of THOR

THOR is a tool that reads GPM's HDF5 file and displays it as an image. It also allows you to check the value of each data stored in the HDF5 file without creating a program.

THOR can run on MAC/Linux/Windows.

#### 4.1.1 Download

Download the appropriate compressed file for your environment from the following URL

<https://gpmweb2https.pps.eosdis.nasa.gov/pub/THOR/>

\*The following description assumes you have downloaded THOR\_2\_2\_linux.zip.

#### 4.1.2 Decompression

Extract the compressed file in an appropriate working directory.

You can decompress it with the following command

```
$ unzip THOR_2_2_linux.zip
```

#### 4.1.3 Installation of THOR

After unzipping, a directory named orbit is created.

Go to the orbit directory and run setupUNIX.sh.

```
$ ./setupUNIX.sh
```



#### 4.1.4 Starting THOR

Executing setupUNIX.sh will create a file named orbitUNIX.sh in the orbit directory.

Running orbitUNIX.sh will start THOR.

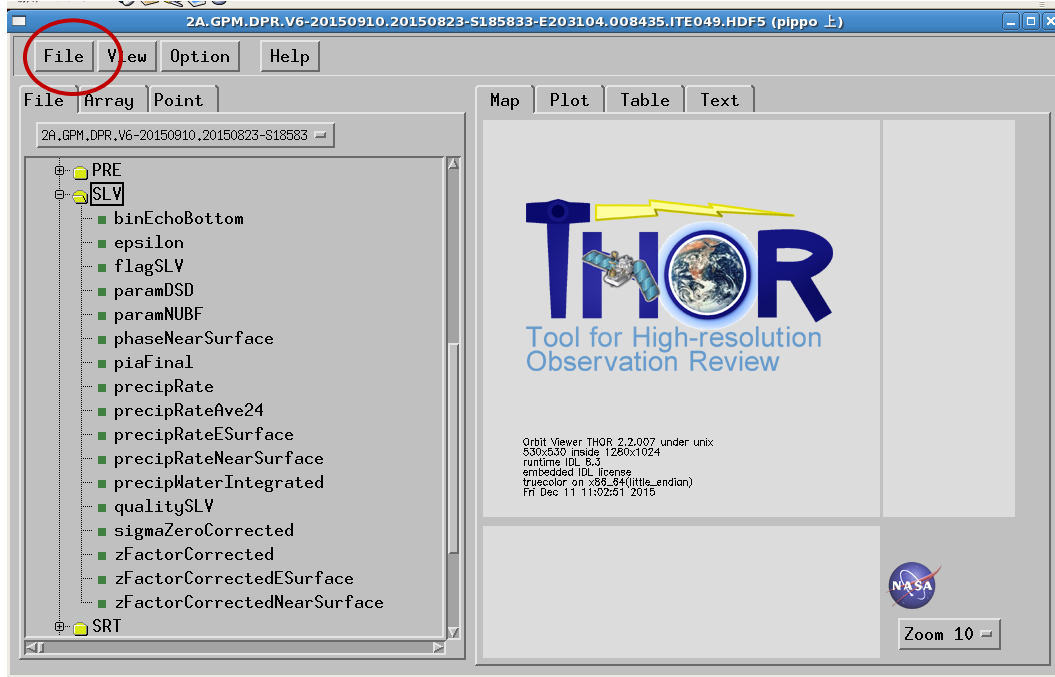
```
$ . /orbitUNIX.sh
```

For Windows, move the orbit folder directly under the C drive and run setupWin.bat in the orbit folder. This will create orbitWin.bat in the same folder. Double-click this orbitWin.bat to start THOR.

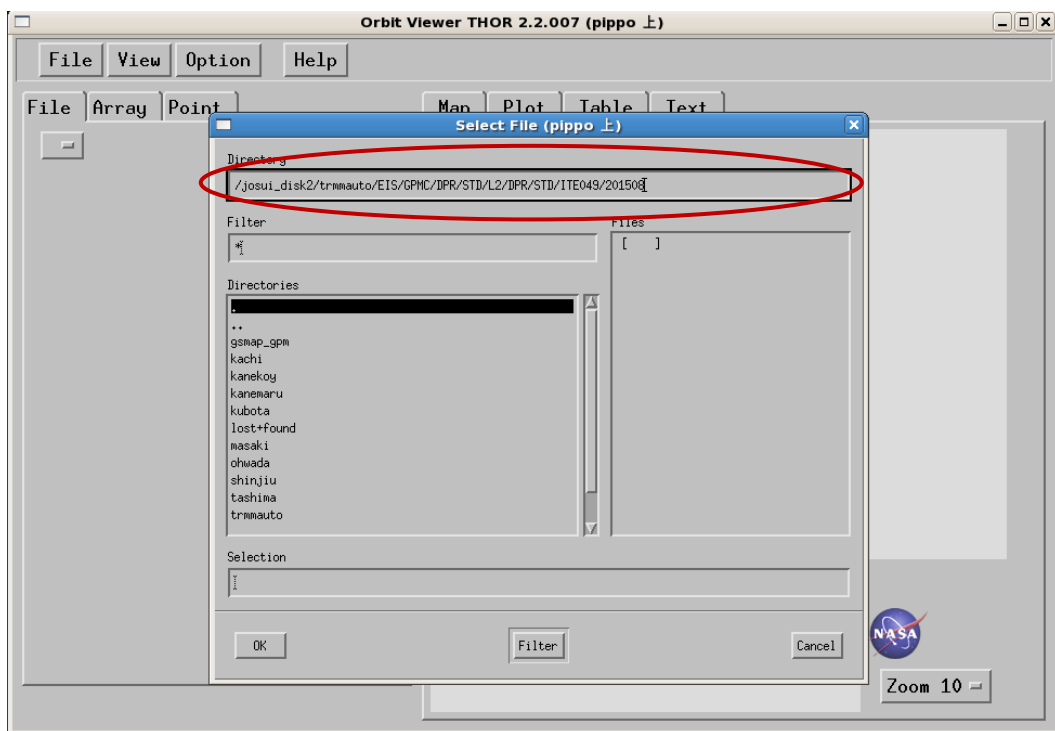
## How to use PPS Viewer THOR

When THOR is started, the following screen appears.

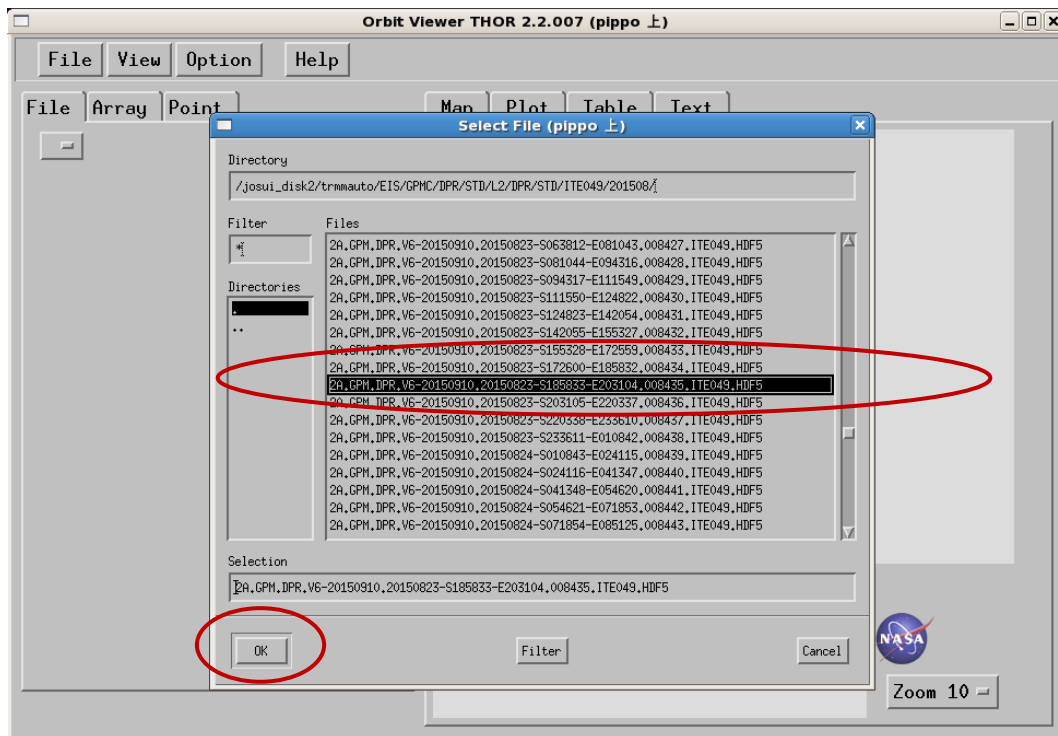
Click the File button to display the menu, then click Open in the menu.



A window for specifying the file will appear. Enter the path to the file to be read.



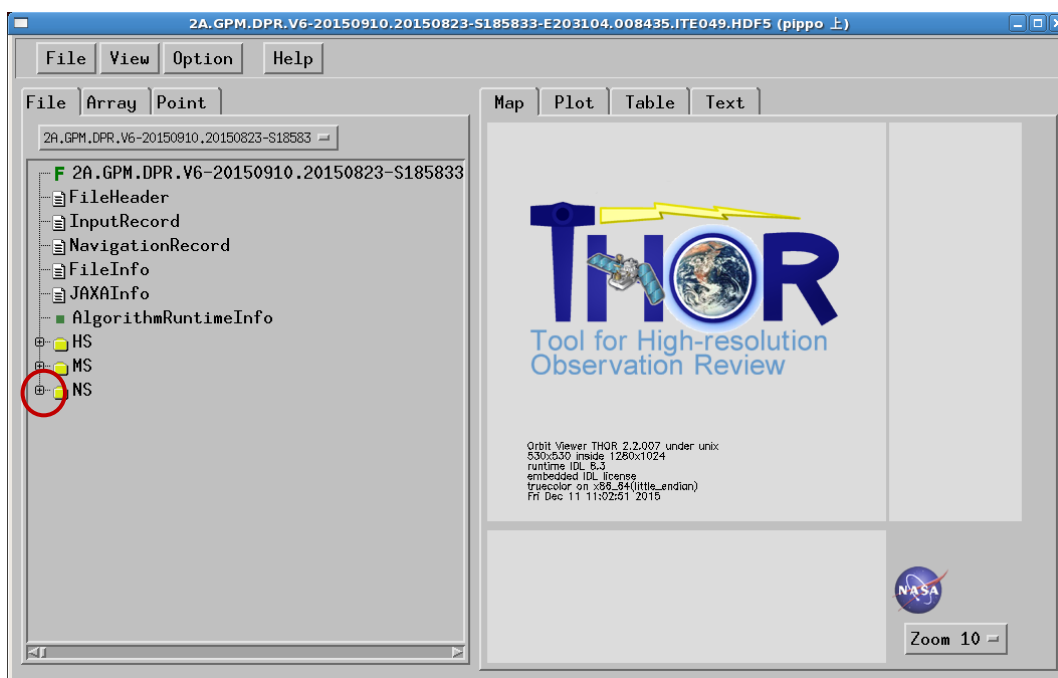
Specify the file to be read and click the OK button.



When the data is read, it is displayed as follows.

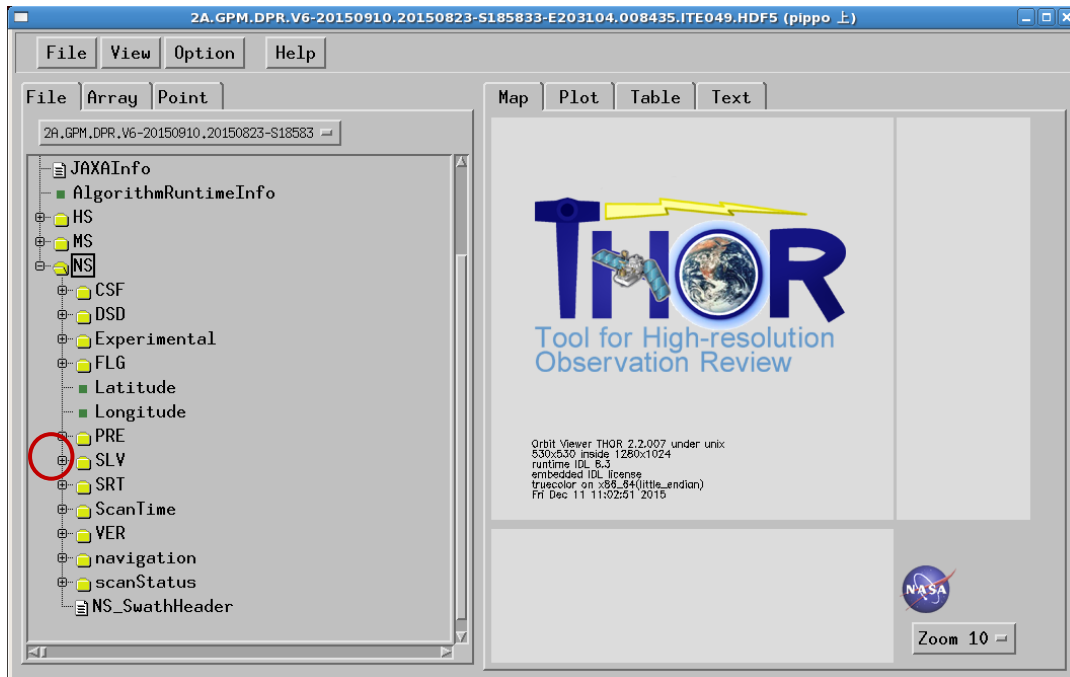
This section describes the operation to display NS.SLV.precipRateESurface (precipitation rate at the ground surface).

Click the [+ ] in front of the NS folder.

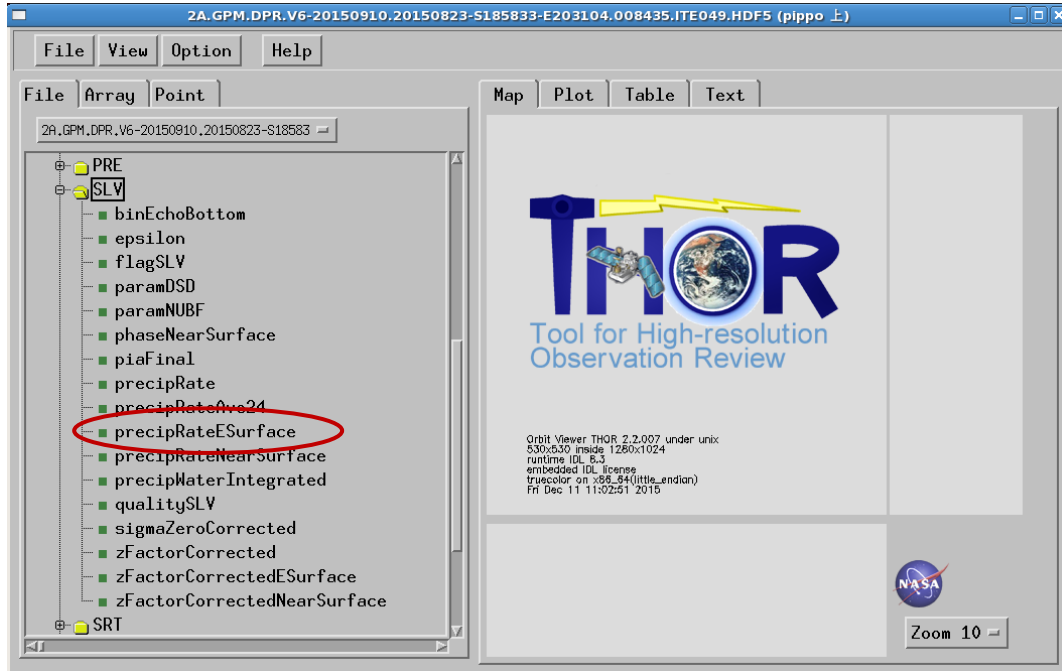


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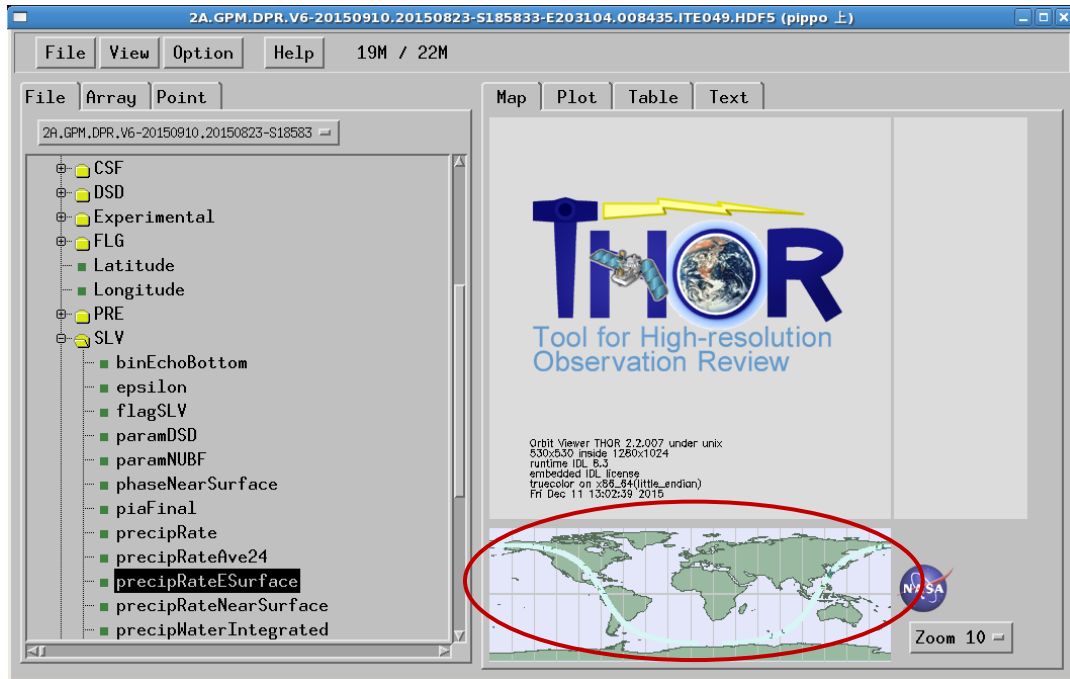
Since the data to be read is in the SLV folder, click the [+] in front of the SLV folder.



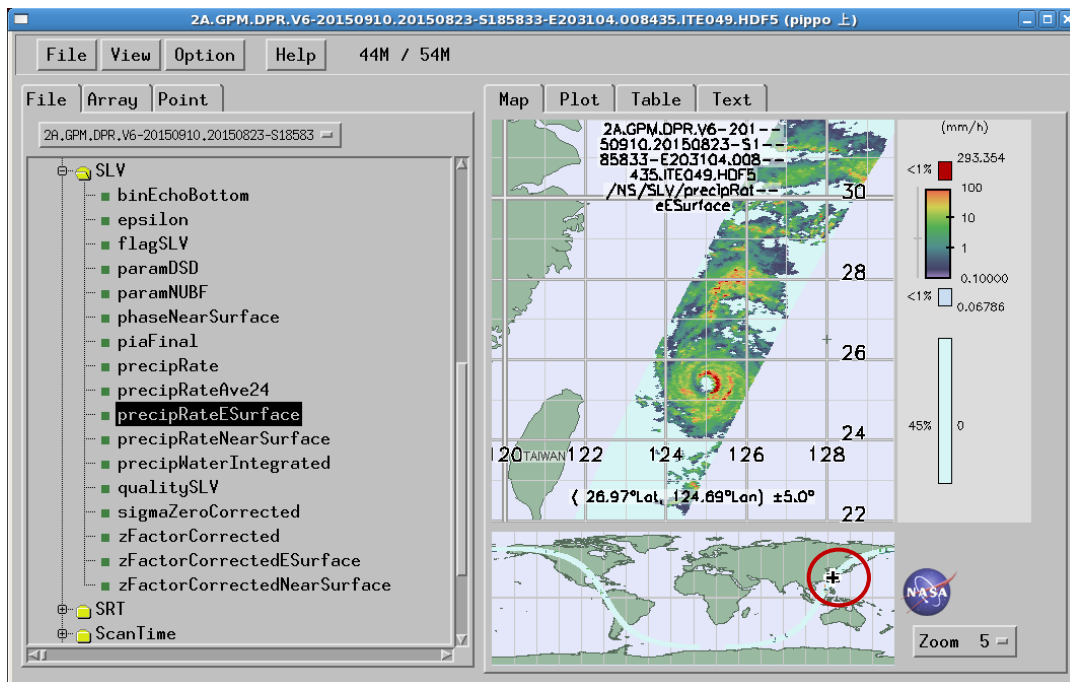
Click on the data `precipRateESurface` to read.



The orbit map will be displayed, and you can use the mouse to specify the location on the orbit that you want to display.

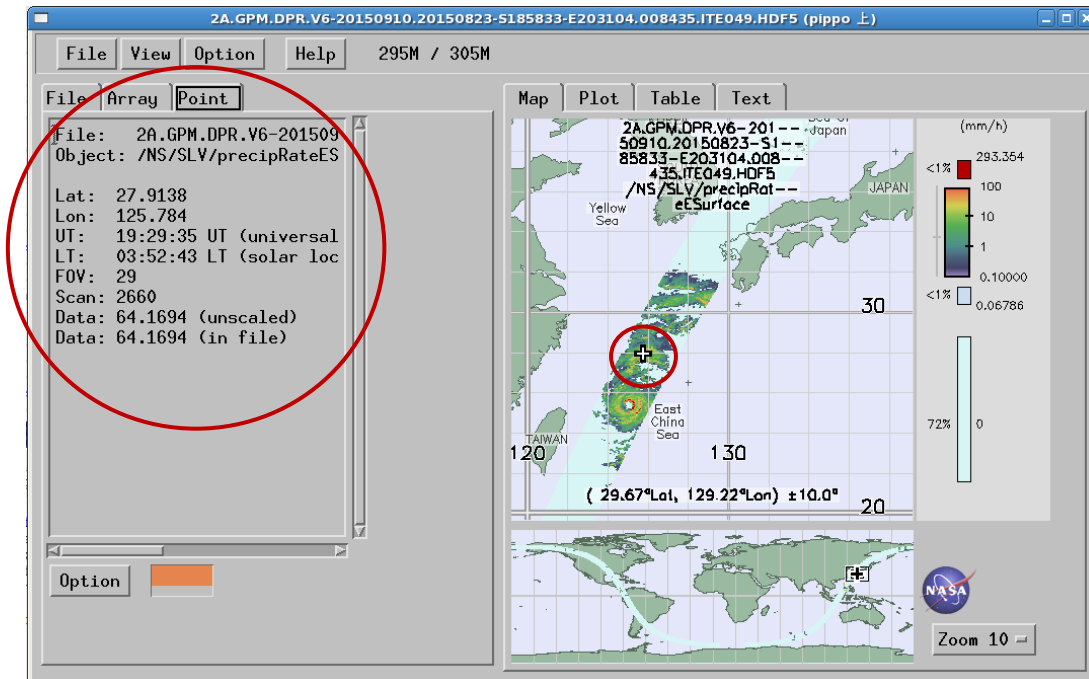


Clicking on a location on the orbit will display an image of that location, as shown below.



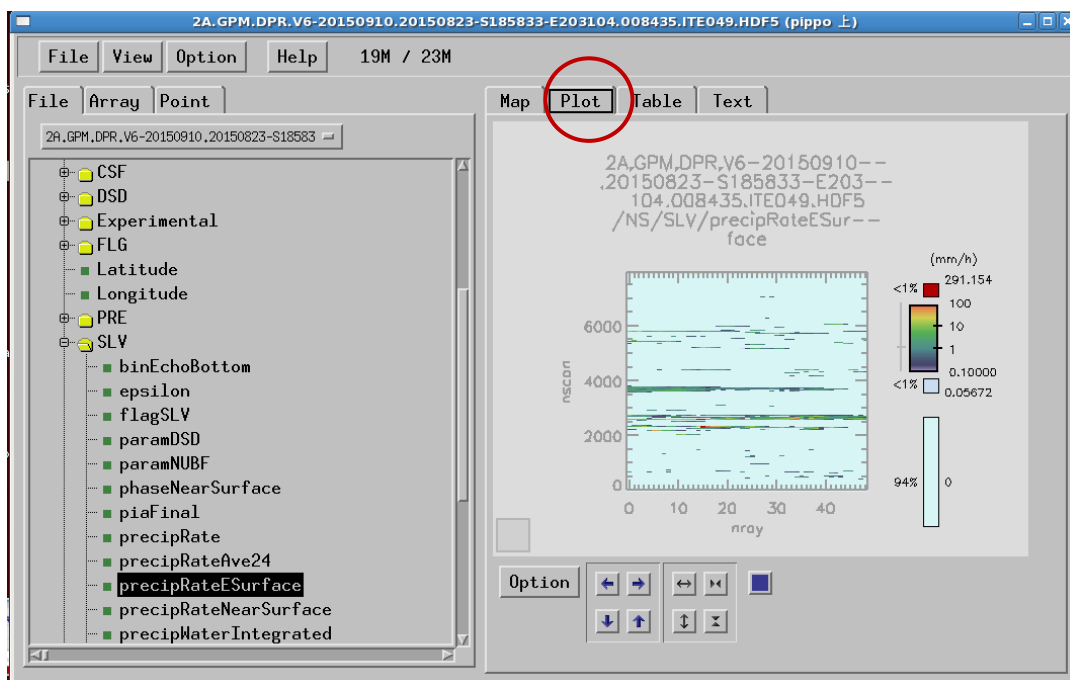
## GPM Data Loading Program Guide (THOR Edition)

Clicking on the map shows its data values (in this case, surface precipitation intensity), location (latitude, longitude, scan number), date and time, etc.

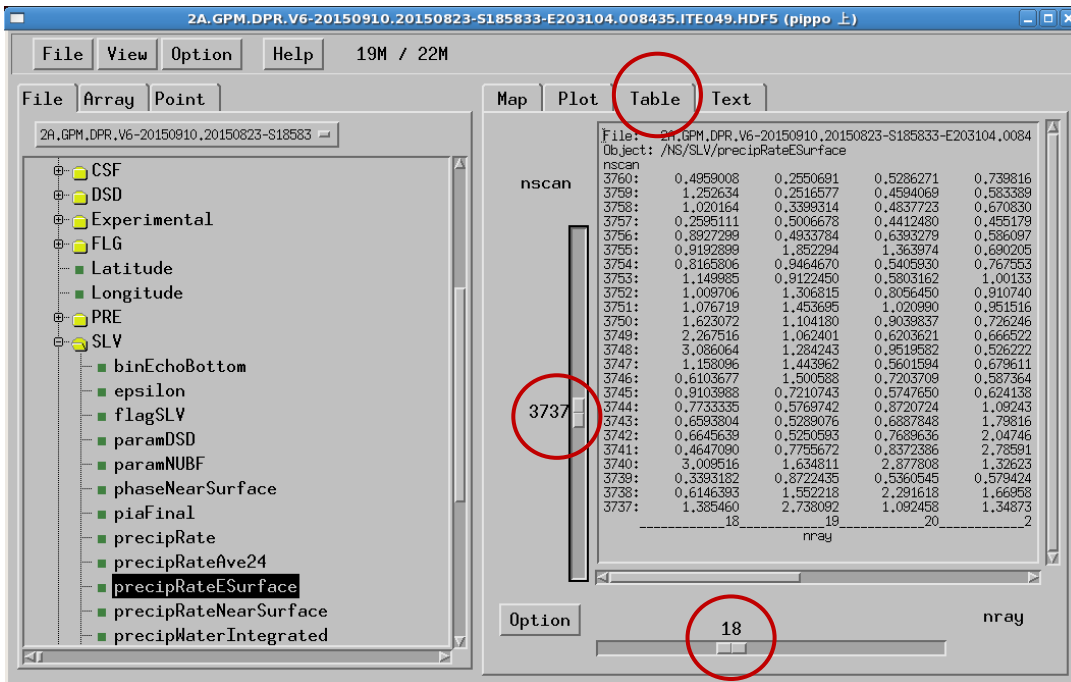


Let's look at the precipRateESurface data. First select the Plot tab.

The following figure is displayed, allowing you to see which parts of the scanned data are recorded. In the figure below, you can see that data is recorded around 2600 and 3600 on the vertical axis.



Next, select the Table tab. precipRateESurface data will be displayed.  
Adjust the vertical and horizontal sliders to see the data.



revision history

version number	Date	Revised contents	remarks
1	2016/1/26		
2	2016/9/26	4.1 Installation of THOR: The procedure to execute setupUNIX.sh was missing, so it was added. Also, added description to execute setupWin.bat for windows version as well.	
3	2017/9/13	1. Introduction: python description added to Table 1.1, flowchart revised accordingly. Table 1.2 Sample code operation check table was added.	
4	4/17/2019	1.-3. Correction due to addition of TRMM and renewal of GPM site	
5	12/6/2021	3. revised availability of related documentation and sample programs 4. correction of URL for THOR download	